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Manufacture of Spirits.

MALTBY AND WEBB'S SPECIFICATION.

TO ALL TO WHOM THESE PRESENTS SHALL COME, we, WILLIAM MALTBY, of Tredegar Square, Mile End, Gentleman, and THOMAS WEBB, of Mare Street, Hackney, Gentleman, send greeting.

WHEREAS Her present most Excellent Majesty Queen Victoria, by Her Royal Letters Patent under the Great Seal of Great Britain, bearing date at Westminster, the Fifteenth day of December, in the eleventh year of Her reign, did, for Herself, Her heirs and successors, give and grant unto us, the said William Maltby and Thomas Webb, our exors, admors, and assigns, Her especial licence, full power, sole privilege and authority, that we, the said William Maltby and Thomas Webb, our exors, admors, and assigns, or such others as we, the said William Maltby and Thomas Webb, our exors, admors, and assigns, should at any time agree with, and no others, from time to time and at all times during the continuance of the term of years therein expressed, should and lawfully might make, use, exercise, and vend, within England, Wales, and the Town of Berwick-upon-Tweed, and in the Islands of Guernsey, Jersey, Alderney, Sark, and Man, and in all Her Majesty's Colonies and Plantations abroad, our Invention of "IMPROVEMENTS IN THE MANUFACTURE OF SPIRITS FROM GRAINS OR OTHER SACCHARINE MATTERS, AND IN THE APPARATUS TO BE USED THEREIN;" in which said Letters Patent is contained a proviso, that we, the said William Maltby and Thomas Webb, do cause a particular description of the nature of our said Invention, and in what manner the same is to be performed, by an instrument in writing under our hand and seal, or under the hand and seal of one of us, to be enrolled in Her Majesty's High Court of Chancery within six calendar months next and immediately after

the date of the said in part recited Letters Patent, as in and by the same, reference being thereunto had, will more fully and at large appear.

NOW KNOW YE, that in compliance with the said proviso, we, the said William Maltby and Thomas Webb, do hereby declare that the nature of our said Inventions of improvements are fully known and ascertained in and by the following description thereof, reference being had to the Drawings hereunto annexed, and to the figures and letters marked thereon, that is to say,

Our Invention consists,—First, of a method or methods of preparing grain intended for brewing or distillation, preparatory to such process of brewing or distillation.

Secondly, in the addition of certain substances, as tartaric or citric acid, to the wort or other saccharine solutions, or to the wine employed for brewing or distilling after the process of fermentation has commenced.

Thirdly, in retaining the vapours and gasses produced during the process of fermentation, and rendering such products serviceable to the process of fermentation by returning them to the solutions under the process of fermentation.

Fourthly, in an improved arrangement and construction of distilling apparatus, by which we can perform the process of distillation in a rapid and continuous manner, together with the means of so regulating the temperature of the alcoholic vapour that the spirit produced may be obtained of almost any strength desired.

Respecting the first named of our improvements, namely, the preparation of the grain and the process of brewing and distilling, our improved method is as follows:—If we employ barley we submit it to heat by any convenient and suitable means until it has lost about twelve and a half per cent. of its weight, being careful not to let the temperature be so high as to burn or scorch the grain. When cold we grind and mix with it one-eighth its original weight of malt, and brew in the usual way. We then add about four pounds weight of the soda of commerce, dissolved in water, to each quarter of barley, if it has been previously treated in the manner herein-before described. Should however the barley not have been so treated, then about three and a half pounds in weight of the soda will be sufficient; mash in the mash tuns for half an hour longer; let the wort run into the fermenting backs. When the temperature of the wort in the fermenting backs has fallen to below 80° Farenheit, add the usual quantity of yeast; when the fermentation has commenced, close tightly the fermenting backs, fill the refrigerator half full of water, adding soda thereto. The agitating apparatus in the fermenting back is put in motion for the purpose of stirring and agitating the wort under the process of fermentation every five or six hours, until the fermentation has ceased, or until

the specific gravity of the liquid is reduced to that or less than that of water. In this state add to the liquid about six pounds in weight of catechu dissolved in hot water, or one and a half pounds of concentrated sulphuric acid diluted with two gallons of water, or such quantity of the said acid, or of any acid diluted with water, as will be sufficient to neutralize the soda previously employed. The wine or wash is now ready for the distilling process. The liquid in the refrigerator may, however, be employed in the before-described operations instead of the soda of commerce, using so much however of the liquid as contains the requisite quantity of soda.

When we employ sugar for the manufacture of spirits we dissolve one hundred weight of sugar in one hundred gallons of water; we then let it run into the fermenting backs, adding thereto two per cent. of yeast to promote the fermentation; we dissolve in the mash tun one and a half pounds weight of soda in one gallon of water, and supply the liquid in the fermenting backs with it, so that the whole shall be in the back on the third day; or we put half pound of carbonate of lime (chalk or marble) into the fermenting back to produce the same effect. Then we proceed in manner as herein-before described for barley. When the fermentation is finished, we add to the liquid two and a half pounds of catechu or nine ounces of sulphuric acid diluted with two gallons of water, or two pounds of acetate of lead.

When we employ molasses for the manufacture of spirits we treat and carry on the process in the same manner as when we employ the sugar for the manufacture of spirits. When we wish to obtain by distillation a very fine but peculiar spirit, we use and employ tartaric acid, or citric acid, or the juice of any fruit containing those acids, (as lemon or lime juice). We mix the acid with the liquid before the process of fermentation, or with the wine or wash after the process of fermentation, in the proportion of three-quarters of a pound of the acid, or the relative quantity of the juice of fruit containing that quantity of acid, to every one hundred and twelve pounds of the solid saccharine matter employed. When the above acids are employed we omit the use of both the soda and the carbonate of lime, or we previously neutralize them.

The rest of our improvements consist in an improved arrangement and construction of apparatus for the distillation of spirits by the agency and means of steam or hot water, or both steam and hot water, such heating medium, whether steam or hot water, passing through coiled pipes or worms in the distilling apparatus, while the outer surfaces of such coiled pipes or worms are in contact with the wine or wash under process of distillation, such wine or

wash being in motion and passing continually along the exterior surfaces of the said coiled pipes or worms, the wine or wash thereby receiving from the passing steam or hot water the heat necessary to effect the process of distillation.

Another of our improvements is the use and employment of the hot water or steam which has passed through the coiled pipes or worms for effecting the distillation, to warm the wine or wash preparatory to its passing through the still itself; we also use and employ for this purpose the waste wash which has passed through the still and undergone the distilling process, this waste wash being heated by jets of steam for this purpose also.

Another of our improvements is the mode we adopt of obtaining from the distilling apparatus a spirit of almost any desired degree of strength variable at pleasure. This desideratum we obtain by means of enclosing within the still head a worm, around the exterior of which the vapour generated from the wash under operation in the body of the still passes in its passage from the still to the refrigerator; through this worm in the still head a stream of cold water passes downwards, the quantity of which is adjusted and regulated by a cock or tap being more or less open, dependent upon the strength required of the spirit distilled. By this improvement we are enabled to obtain spirit at any required strength, and consequently to pass over the vapour generated from the distilling process at any required and equal temperature, a thermometer being applied to the apparatus at the head of the still for the purpose of ascertaining the temperature of the passing vapour, and consequently the strength of the spirit produced.

The Drawings hereunto annexed represent an arrangement of our improved apparatus for distilling. Sheet A, Figure 1, representing the refrigerator and the fermenting backs, and Figure 2 a transverse section of ditto. A, the wood back or tank containing the worm B, the lower end of which communicates with the fermenting back; C, D, a pipe communicating with the mash tun; E, apparatus or agitator, by the revolving motion of which the carbonic acid gas is forced through the fermenting liquid; this agitator is constructed of two leaves E, E, fixed upon the shaft or axle G, placed longitudinally in the fermenting back C, one end thereof passing through the end of the back and having a handle fixed thereon for the purpose of giving revolving motion to the agitator. The faces or surfaces of the leaves E, E of the agitator are formed with projecting bars or ribs, placed so as to divide the entire surface of the leaves into a series of divisions or cells, each alternate one having a hole at or near the centre of the cell through the leaf. Holes is also made through the bars or ribs laterally to communicate from the cells having no holes to those having holes through the leaf. These holes are for the passage of the

gas during the rotation of the agitator. These series of cells or divisions are formed only upon those sides or faces of the leaves in the direction of their motion. H, supply pipe from the mash tun.

Figure 3, Sheet B, represents our improved distilling apparatus in section; and Figures 4 and 5, Sheet C, show respectively plans in section of the body of the still through the line X, X, and the wine or wash strainer through the line Z, Z. The same letters refer to corresponding parts in these three Figures. A, the body of the still, which is constructed of wood, as represented, or may be found of metal if more desirable. Within the body of the still are arranged the shelves or trays B, B^{I}, B^{II}, B^{III}, one above another, at about equal distances from each other; these shelves are provided with vertical ledges, placed in such manner as to form coils or spirals C, C^{I}, C^{II}, C^{III}, of a number of turns upon the shelves, thus forming upon each of the shelves a spiral channel from the circumference to the centre, or vice versa. Within these channels are placed the coils of pipe or worms D, D^{I}, D^{II}, D^{III}, the spiral channels C, C^{I}, C^{II}, C^{III}, being for the passage of the wine or wash submitted to the process of distillation, which enters the still by the pipe E^{I}, being delivered at the inner extremity of the spiral channel or coil C upon the upper shelf B, from whence it traverses the spiral channel or coil until it discharges itself from the outer extremity of such coil or spiral channel C by the pipe E^{II}, which delivers it into the spiral channel C^{I}, upon the shelf B^{I} at its outer extremity; it traverses this spiral towards the centre, when it is discharged by the pipe E^{III} into the spiral channel C^{II}, upon the shelf B^{II}, which it traverses in like manner until discharged at the outer extremity by the pipe E^{IIII}, from whence it descends to the spiral channel C^{III}, and then to the receiver G, placed beneath the still as waste wash, the spirit having been extracted from it during its passage through the still. The coils of pipes or worms D, D^{I}, D^{II}, D^{III}, are for the purpose of passing through the still the steam or hot water, or steam and hot water, as desired, for producing the requisite degree of temperature necessary for the process of distillation. The steam enters first the lower coil of pipe or worm D^{III} at the centre by the pipe F, traverses toward the circumference the spiral channel C^{III}, and then ascends by the pipe F^{I} to the coil or worm D^{II} upon the shelf B^{II}. It traverses the spiral channel C^{II}, from thence through the coil D^{I}, and is finally discharged by the pipe F^{II} into the receiver H. From the receiver H the upper coil of pipe or worm D upon the shelf B is supplied with a stream of hot water or steam, according to the working of the still, by the pipe F^{III} at its outer extremity, and traversing the spiral channel C is discharged from the inner

extremity by the pipe F^{III}. This hot water after passing through the still we do not allow to run to waste, but we employ it to warm the wine or wash in its passage to the still. For this purpose we convey the hot water by the pipe F^{III} to the first of the two vertical wood trunks or boxes I, I^1, from whence it is conveyed to the other by the horizontal pipe I^{II}, near the lower parts. From I^1 the water is allowed to run to waste by the pipe I^{III}. These trunks I, I^1, stand upon the wood back K of the wine warmer and strainer. Within the wood back K is placed the inner vessel L, corresponding in shape to the back K, but less in size, so as to leave a space or interval between them. This strainer vessel L is of copper tinned. At about the middle of this vessel is fixed in a horizontal direction the strainer L^1, which is composed of fine wire gauze, between the meshes of which the wine passes in its passage to the still. The vessel L is thus divided by the gauze strainer into two parts. From the upper of these divisions passes the pipe E^1 upwards through the middle of the trunk I to the still, the pipe E for supplying wine to the apparatus passing downward through the other trunk I^1 into the lower division of the vessel L. Thus it will be seen that the wine or wash, as supplied to the apparatus, passes through the pipe E, where it is slightly warmed by the warm water in the trunk I^1, to the lower division of the vessel L below the gauze strainer, through which the wine is strained, the impurities being left behind in the lower division of the vessel L after passing through the strainer, where the wine or wash is further warmed by the interval of space between the vessel L and the wood back K being filled with hot waste wash from the receiver G beneath the still. From the upper division of the straining vessel L the wine or wash passes up the pipe E^1 within the other trunk I, by which it is further heated, and is then supplied to the still, through which it passes, as before described, the impurities from the wine collecting in the lower division of the straining vessel L being occasionally drawn off and discharged into the waste wash receiver G by the pipe L^1; G^1, a pipe passing into the lower part of the waste wash receiver G, and turning upwards, terminates with T head, which is perforated with holes upon either side but in opposite directions; the pipe supplies steam for the purpose of heating the waste wash to a sufficient degree of temperature preparatory to its being passed into the warmer and strainer back K by the pipe L^{II}, for heating the wine in its passage through the strainer, it being discharged from the strainer back by the pipe K^1; the pipe and stop-cock G^{III} are for the purpose of emptying the receiver G when required. M, the column and still head, within which traverses the worm N, which communicates at its upper extremity by the pipe N^1 with the worm vessel S, from

whence it receives its supply of cold water. The lower extremity of the worm N communicates by the pipe N^{11} with the receiving vessel H, into which is discharged the water after traversing the worm N, when it becomes heated by the steam discharged into the receiver by the pipe E^{11} from the still, and then passes through the still by the pipe F^{111}, as before described. The pipe N^1 is provided with a stop-cock O for the purpose of regulating and adjusting the supply of cold water to the worm N at the bottom of the column M, between the column and the still. A a perforated plate or colander P, for the purpose of diffusing the vapour generated in the still in its passage from the still through the still head, around and in contact with the worm N, over into the receiver Q, through the worm S^1, in the back S and the worm R^1, in the back R, in the manner usual in such processes. Upon the top of the column is the thermometer T, the bubb of which passes just within the top of the column for ascertaining the temperature of the vapour passing over, and consequently the strength of the spirit produced. Should the strength of the spirit produced not be that required, the stop-cock O upon the pipe N must be closed or opened to a greater or less extent to allow a greater or less quantity of water to pass through the worm N, so that the vapour passing over may be more or less elevated in temperature as required. Upon the receiver H is attached the safety value H^1, for the purpose of relieving the receiver from any accumulated pressure of steam therein. Other parts of the apparatus being those of the usual arrangement and contruction, require no further explanation, being well known. In commencing the process of distillation with this our improved apparatus by the pipe E through the strainer L and the still A a flow of cold water is caused to circulate and is discharged at the stop-cock G^{111}; steam is now turned on through the stop-cock F, and passing through the apparatus heats the flow of water. When the water flows from the stop-cock G^{111} boiling hot (212°), we admit the wine or wash through the apparatus by the pipe E and shut off the stop-cock G^{111}, when the still will commence working; the thermometer T upon the still will indicate about 180° when working strong spirit, the vapour then containing 93 per cent. by volume of alcoholic vapour.

Having now described the nature of our Inventions, and described and illustrated the manner in which the same is carried into operation, we claim as of our Invention,—

First, the separation of the oil contained in barley or other grains employed in brewing or distilling by heat, also the application of carbonate soda or potash to the wort employed in brewing or distilling before its separation

from the grains when it is intended to use such other acids as will neutralize the alkalies.

Secondly, we claim the application of tartaric or citric acid, or the juice of any fruit containing either of those said acids, to a solution of saccharine matter, or to the wine or wash employed in the process of distillation. We also claim the purifying the wine or wash, whether the before-named ingredients are employed or not, by the employment of catechu or any other substance containing tannin, or acetate of lead, or alum, or any other substance that will precipitate its impurities.

Thirdly, we claim the construction and application of the apparatus for collecting, condensing, and permitting the return of the volatile products of fermentation to the fermenting liquid. We also claim the causing the carbonic acid generated during fermentation to pass again through the fermenting liquid.

Fourthly, we claim the warming the wine or wash before being submitted to the operation of distillation by hot water from the still and by the spent or waste wash, as herein-before described.

Fifthly, we claim the performing the process of distillation by means of steam and hot water, or by means of steam or hot water in manner as herein-before described.

Sixthly, we claim the causing the alcoholic vapour from the still to pass on the outside of a worm, through which worm water is allowed to flow for the purpose of retaining the alcoholic vapour at any required degree of temperature below 212° Fahrenheit.

In witness whereof, I, the said William Maltby, have hereunto set my hand and seal, this Fifteenth day of June, One thousand eight hundred and forty-eight.

WILLIAM (L.S.) MALTBY.

Signed, sealed, and delivered by the within-named William Maltby and Thomas Webb in the presence of

Enrolled the Fifteenth day of June, in the year of our Lord One thousand eight hundred and forty-eight.

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